

TETRAETHYL LEAD (TEL)

0.075 mg/m³ (as lead) - Skin

Extensive and carefully controlled manufacturing experience has indicated that a level of 0.075 mg per cubic meter of air (measured as lead) is a good guideline for an allowable air concentration of TEL. Despite this guideline it has been repeatedly noted that the ability of TEL to penetrate the skin makes reliance on the airborne concentration impractical in many situations (1). A concentration of 100 mg (as Pb)/m³ for one hour may produce illness (2). One tenth milliliter of TEL applied to the back of a rat has caused death within 24 hours (3).

The signs and symptoms of poisoning from tetraethyl lead relate primarily to the central nervous system and differ from those due to inorganic lead poisoning. The determination of lead in the blood is of no value in evaluating the degree of absorption of TEL. Urinary concentration of lead may be used as a guide to absorption of TEL (3).

Reliance on industrial experience is the basis for establishment of the threshold limit but it must be recognized that inhalation may be of only minor importance in prevention of undue exposure. Percutaneous absorption may be a very significant factor and must be considered at all times in planning protection.

References:

1. Ethyl Corporation, Medical Department: personal communication.
2. Fleming, A.J.: Lead Symposium Feb. 25-27, 1963, The Kettering Laboratory, University of Cincinnati.
3. Laug, E.P., Kunzel, F.M.: Ind. Hyg. Tox. 30, 256, (1948).
4. Sanders, L.W.: Lead Symposium Feb. 25-27, 1963, The Kettering Laboratory, University of Cincinnati.

TETRAMETHYLLEAD (TML) - Skin

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The 30-minute LC₅₀ for mice is 40.8 g/m³ at a one day follow-up period of observation and 8.5 g/m³ at a ten day follow-up period (1). The LC₅₀ for rats is approximately 8.87 mg/liter (2). The studies of Davis, et al. (3), though limited to six dogs, should be considered carefully as they indicate that dogs are more sensitive to TML than are rats. There are no long-term animal inhalation studies available.

Comparison of the physical-chemical properties of TML and the better known TEL indicates that TML is considerably more volatile (4). Despite the difference in volatility and manufacturing experience which indicates that atmospheric exposure is about three times higher in the TML plant than it is for TEL manufacture, the concentration of lead in the urine of the workmen exposed to TML and those exposed to TEL were not significantly different. Neither group had symptoms of illness and all urine-lead concentrations were within normal limits (4).

Manufacturing experience has indicated no apparent problems under the present system of hygienic controls. Despite the difference in volatility between TML and TEL, the threshold limit value of 0.075 mg of lead/m³ of air appears to furnish an ample margin of safety for either compound. Skin absorption is a potential additional hazard with TML.

References:

1. Castellino, H. et al.: Brit. J. Ind. Med. 20, 63 (1963).
2. Cremer, J.E.: Brit. J. Ind. Med. 18, 277 (1961).
3. Davis, R.K., et al.: Arch. Env. Health 6, 472 (1963).
4. deTreville, R., et al.: Arch. Eng. Health 5, 532 (1962).